

REMARKS

The above amendments and the following remarks are fully and completely responsive to the Office Action dated November 6, 2003. By this amendment, claims 3, 5 and 12 have merely been amended to more particularly point out and distinctly claim the invention. No new matter has been added nor amendments made that narrow the scope of any element of any claim. Accordingly, claims 3-12 are pending and presented for reconsideration.

Claims 3, 5 and 12 were objected to for a minor informality. By this amendment, the claims have been amended in the manner suggested by the Examiner. Therefore, the rejection is moot and the Applicants respectfully request that the objection be withdrawn.

Claims 3-8 and 11-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Osburn et al. (U.S. Patent No. 3,825,245, "Osburn") in view of Matsumiya et al. (U.S. Patent No. 5,291,662, "Matsumiya") and DE004126532 (DE '532). The Office Action took the position that Osburn discloses all the limitations of the claimed invention, except for a coordinate-measuring device for bringing a probe thereof close to the work in the waiting position of the auto pallet changer, directly after the work is machined by the machining tool and placed on the waiting position, moving the tool of the machining tool and the probe in a horizontal direction and orthogonal to each other or a refuge means. Matsumiya and De'532 are cited for teaching these limitations.

However, Applicants submit that claims 3-8 and 11-12 recite subject matter that is neither taught nor suggested by any combination of the prior art.

Applicants' amended claim 3 recites a work form-measuring method including the steps of: placing a work on a waiting position of an auto pallet changer directly after the work has been machined by a tool of the machining tool; bringing a probe of a coordinate-measuring machine close to the work in the waiting position of the auto pallet changer and then measuring the forms and dimensions of the work, the coordinate-measuring machine being arranged in the vicinity of the machining tool; and moving the machining tool and the probe of the coordinate-measuring machine to the work in a horizontal direction of motion and orthogonal to each other.

Applicants' amended claim 5 recites a work form-measuring apparatus including an auto pallet changer for moving a work between a waiting position and a machining position at an inlet of a machining tool. A coordinate-measuring machine is provided for bringing a probe thereof close to the work in the waiting position of the auto pallet changer directly after the work has been machined by the a tool of the machining tool and placed on the waiting position, to thereby measure the forms and dimensions of the work. The tool of the machining tool and the probe of the coordinate-measuring machine move toward the work in a horizontal direction of motion and orthogonal to each other.

Applicants' amended claim 12 recites a coordinate-measuring machine disposed in the vicinity of a machining tool for getting a probe thereof close to a work in a waiting position of an auto pallet changer directly after the work has been machined by a tool of the machining tool and placed on the waiting position, to thereby measure the forms and dimensions of the work. The tool of the machining tool and the probe of the

coordinate-measuring machine move toward the work in a horizontal direction of motion and orthogonal to each other.

The Office Action took the position that the combination of the prior art discloses all the elements of the claimed invention. However, it is respectfully submitted that the prior art fails to disclose or suggest the claimed invention, and therefore, fails to provide the steps, the structure, and the advantages that are provided by the present invention. For example, the present invention provides for placing a work on a waiting position of an auto pallet changer directly after the work is machined by a machining tool. Thereafter, a probe is brought of a coordinate-measuring machine close to the work in the waiting position of the auto pallet changer and then the forms and dimensions of the work are measured. The coordinate-measuring machine is arranged in the vicinity of the machining tool. This provides a work form measuring method and device which are capable of shortening the production line, including the measurement, as discussed generally in Applicants' specification.

In the present invention a horizontal type three-dimensional coordinate measuring machine is connected to a make-ready area (waiting position) of a machining center. The machining center has an auto pallet changer and is located at a transfer area with a linear pallet pool in line machines.

Osburn discloses a workpiece changer mechanism for a machine tool. As shown in Fig. 1, the machine includes a horizontal grid 20, machine table 24, supporting power table 27 and a work carrying pallet 30 releasably clamped to the pallet table 27 for selective indexable movement therewith. To perform machine operation on the workpiece secured to the pallet 30, a milling cutter carried by tool spindle 40 is

selectively movable by affecting relative bodily movement between spindle 40 and pallet 30. Motor 42 is operative to effect X-axis movement of the table 24 and work pallet 30 and moves table 24 to a rightward limit of X-axis movement in preparation for a work or pallet changing operation. Work changer 44 includes a machine base 45, index table 46 rotatably supported by the base, and pallet support 47 carried by the index table for 180° indexable movement.

To begin machining, pallet 30 is clamped in the machining station 31 and supports an incomplete machined workpiece. Pallet arm 55 is maintained in a hydraulically retracted empty position shown in Fig. 9. After machining is completed, the empty pallet arm 55 is extensibly advanced outwardly into positive latch engagement with pallet 30 and then reversibly retracted inwardly with the pallet 30 and the now completely machined workpiece carried thereby.

Matsumiya discloses a three-dimensional measuring machine. As shown in Fig. 14, machine 201 is mounted on movable carriage 211. Carriage 211 is positioned adjoining bed 216. Carriage 211 is designed such that the object to be machined can be measured directly at the machining site.

DE '532 discloses a three-dimensional coordinate-measuring apparatus for workpieces. As discussed in the Abstract of DE '532, the coordinate measurement arrangement contains a horizontal coordinate reference surface for a measurement transducer with a vertically movable sensing arm and sensor.

The Office Action took the position that Fig. 14 of Matsumiya discloses bringing a probe of the coordinate measuring machine 201 close to a work on table 217 of the

machining tool 215. The Office Action further took the position that the movable carriage 211 of Matsumiya is considered to be a refuse means.

It was then concluded that it would have been obvious to one of ordinary skill at the time to include a coordinate measuring machine with a refuse means, as taught by Matsumiya, in Osburn for the purpose of measuring the work directly at the machining site in real time to prevent the production of inferior goods.

The Office further asserted that the machining tool and the probe of the coordinate measuring machine of Matsumiya are vertically oriented and that Matsumiya teaches that both the machining tool and the probe of the coordinate measuring machine move toward the work in the same direction of motion. The Office Action also asserted that in DE '532, the coordinate measuring machine has a horizontal direction of motion. The Office Action concluded that absent any criticality, it would be an obvious design choice to position the tool of the machining tool and the probe of the coordinate measuring machine orthogonal to each other, such that the displacement commands provided to the machine tool and the displacement data provided by the coordinate-measuring machine correspond to parallel frames of reference, thereby simplifying the analysis and the correlation of the data.

However, the spindle of the three-dimensional coordinate measuring machine is vertically driven in Matsumiya, whereas the spindle of the three-dimensional coordinate measuring machine of the present invention is horizontally driven.

Furthermore, although the machine tool and the three-dimensional coordinate measuring machine of Matsumiya are disposed so as to face each other, in the present invention, the machine tool and the three-dimensional coordinate measuring machine

are disposed adjacent to each other so that the orientations of the respective spindles thereof, which are horizontally driven, become orthogonal to each other. As a result of this claimed configuration, effective utilization of space can be further improved, and an advantage such as quick commencement of measurement with respect to the work after machining is made possible.

Therefore, Applicants have attributed a specific purpose for the claimed arrangement and thus, the is arrangement is not a mere design choice.

Furthermore, with respect to the allegation of lack of criticality, Applicants note that that the Office Action has provided no reference of this assertion of obviousness. According to MPEP § 2143.01, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is **some teaching, suggestion, or motivation** to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. The Office has failed to provide any authority in support of the assertion of obviousness.

Therefore, Applicants respectfully submit that Osburn, as modified by Matsumiya and DE '532 fails to disclose or suggest moving the tool of the machining tool and the probe of the coordinate-measuring machine to the work in a horizontal direction of motion and orthogonal to each other, as recited in Applicants' amended claims 3, 5 and 12.

Thus, it is respectfully submitted that Applicants' invention, as set forth in claims 3, 5 and 12, is not obvious within the meaning of 35 U.S.C. § 103.

Still further, in the interview conducted on July 30, 2003, Applicants' representative presented arguments with respect to the orientation of the machining tool and the probe of the coordinate measuring machine of the present invention. The Examiner suggested that if the Applicants' amended claims 3 and 5 to include the limitation that the machining tool and the probe are orthogonal, this would overcome the standing prior art rejection. (A copy of the Interview Summary is attached for the Examiner's convenience.) However, the Examiner has now made the rejection final. As the Applicants fully understand that the Examiner may further search any claimed limitation, Applicants' respectfully submit that the rejection was improperly made final, and therefore request that the finality be withdrawn.

As claim 4 depends from claim 3, and claims 6-8 and 11 depend from claim 5, Applicants respectfully submit that each of these claims incorporate the patentable aspects thereof and are therefore allowable for at least the same reasons as discussed above.

Claims 9 and 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Osburn in view of Matsumiya and DE '532,, and further in view of Yoshida (U.S. Patent No. 4,473,883). In making this rejection, the Office Action took the position that Osburn, as modified by Matsumiya and DE '532, discloses all the elements of the claimed invention, except for the machining tool and coordinate measuring means mutually exchanging a measurement enabling signal and a measurement completion signal, both of which are related to the movement of the work by the changer, or the coordinate measuring means leaving a refuge position after having received a change movement completion signal. Yoshida was cited for disclosing these limitation.

Yoshida discloses a machining system and control system therefore. This system includes a pallet magazine 11 on which a plurality of pallets PA are carried, with each pallet PA being carried on a pallet table. Pallet changers APC1 and APC2 are located near pallet magazine 11. Yoshida teaches using a coordinate-measuring machine MUNT to measure the work in a waiting position of an auto pallet changer APC4 and then measuring the form and dimension of the work.

However, as discussed above, the combination of Osburn, Matsumiya and DE '532 fails to disclose or suggest the claimed invention. Yoshida fails to rectify their deficiencies. Therefore, Applicants submit that prior art, either alone or in combination, fail to disclose or suggest the claimed invention.

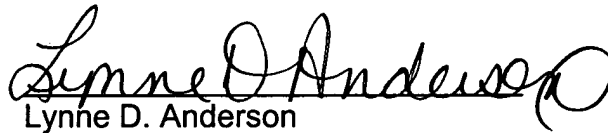
Thus, Applicants respectfully request that the rejection be withdrawn.

CONCLUSION

Applicants submit that the application is now in condition for allowance. If the Examiner believes the application is not in condition for allowance, Applicants respectfully request that the Examiner contact the undersigned attorney by telephone, if it is believed that such contact will expedite the prosecution of the application.

The Commissioner is authorized to charge payment for any additional fees which may be required with respect to this paper to Deposit Account No. 01-2300, referencing Attorney Docket No. 107292-09003.

Respectfully submitted,

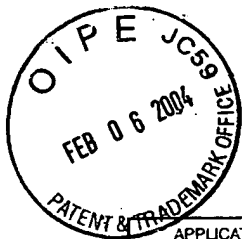
A handwritten signature in cursive script, reading "Lynne D. Anderson". The signature is written in black ink and is positioned above the printed name and registration number.

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Enclosure: copy of Interview Summary dated July 30, 2003



UNITED STATES DEPARTMENT OF COMMERCE
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EXAMINER	
De Jesús, Lydia M.	
ART UNIT	PAPER NUMBER
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DATE MAILED:

INTERVIEW SUMMARY

All participants (applicant, applicant's representative, PTO personnel):

- (1) Diego FF. Gutierrez (3) Lynne D. Anderson
(2) Lydia M. De Jesús (4) _____

Date of Interview July 30, 2003

Type: ☐ Telephonic ☐ Televideo Conference ☒ Personal (copy is given to ☒ applicant ☒ applicant's representative).

Exhibit shown or demonstration conducted: ☐ Yes ☒ No If yes, brief description: _____

Agreement ☐ was reached. ☐ was not reached.

Claim(s) discussed: 1, 2, 3, 5 and 12

Identification of prior art discussed: Osburn et al., Matsumiya et al.,
and DE 412 6532 A1

Description of the general nature of what was agreed to if an agreement was reached, or any other comments: Applicant presented arguments regarding the orientation of the tool with respect to the probe in the disclosed apparatus. Suggested adding language similar to claim 3 into claims 1 and 5, adding that the tool is orthogonal to the probe of the cmm, in order to overcome the standing Prior Art rejection.

(A fuller description, if necessary, and a copy of the amendments, if available, which the examiner agreed would render the claims allowable must be attached. Also, where no copy of the amendments which would render the claims allowable is available, a summary thereof must be attached.)

☐ It is not necessary for applicant to provide a separate record of the substance of the interview.

Unless the paragraph above has been checked to indicate to the contrary, A FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION IS NOT WAIVED AND MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW.

Minor Note: You must sign this form unless it is an attachment to another form.

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